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ABSTRACT

This report describes the instructional design for a Multiple Position Letter Sorting Machine (MPLSM) operator's course administered via the Automated Instructional Development System (AIDS). AIDS is an innovative system consisting of a unique special purpose computer, innovatively designed software, and individualized adaptive instruction. The design and specifications for the course are described in six sections and two appendices. Included are descriptions of the pedagogical principles which form the basis for course design, course structure, course organization, remediation strategies, student feedback modes, refresher training, and the roles of the instructor. Appendices detail the module objectives and entry characteristics tests. (Author/JEG)

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Instructional Design for MPLSM Operators' Training on the Automated Instructional Development System (AIDS)

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FOREWORD

This report documents the design for the AIDS administered training program for the MPLSM operator's job developed under Project POSTALAIDS. Project POSTALAIDS is a development project undertaken by the Human Resources Research Organization (HumRRO) under Contract No. 104230-76-W-1454 to provide the U.S. Postal Service with an adaptive computer-administered instructional system.

The research and development is being conducted at HumRRO's Eastern Division where Dr. J. Daniel Lyons is the Director. Dr. Robert J. Seidel is the Principal Investigator for this project. Technical contributions to this report were made by USPS Headquarters personnel, Ms. Rebecca Gray, Mr. George Buonocore, and Mr. William Peterson.

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SUMMARY

This report describes the instructional design for an MPLSM operator's course administered via the Automated Instructional Development System (AIDS). AIDS is an innovative system consisting of a unique special purpose computer, innovatively designed software and individualized, adaptive instruction. The design and specifications for the course are described herein.

This report contains six sections and two appendices. The Introduction briefly discusses the pedagogical principles which form the basis for the course design. This is followed by sections on Course Structure, Course Organization, Remediation Strategies, Student Feedback Modes, Refresher Training and The Roles of the Instructor. The appendices present the module objectives (Appendix A), and Entry Characteristics Tests (Appendix B).

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INTRODUCTION

As a result of our detailed analysis of the MPLSM operator's job and work environment, we have developed a training plan which incorporates several key pedagogical principles which are relevant to the training requirements of this job.

- Functional context training. Instruction and practice will be provided in the context of the job. Following training in such enabling skills and knowledges as learning to use the keyboard properly, realistic contexts will be provided in which the trainee will learn to key according to the appropriate scheme code. For example, in the Lesson D (scheme training) modules, the five-digit zip code cues will be presented in the context of addresses on facsimile envelopes. Realistic presentation of training materials will be a feature of many training program modules. The final qualification test will contain facsimile envelopes and cards which reflect the address frequencies found when we sampled actual Syracuse mail.

- Realistic simulation of the job environment. This is related to functional context. The cues that the trainee learns to respond to shall be as close as possible to the cues the operator responds to on the job.

- Forced-pace practice. HumRRO research (and the research of others) has shown that extensive forced-pace practice of keying skill is the most efficient and effective method of achieving mastery of the type of job performance required of an MPLSM operator.

- Overlearning. Each succeeding session will incorporate practice of the skills learned in previous lessons, plus introduction and practice of new skills. Literature on the psychology of associative learning and transfer of psychomotor skills supports this approach where interference paradigms exist. The MPLSM

requirement for varied keying responses to similar numerical stimuli presents such paradigms. In all instances, the trainee must learn to relate the scheme contexts to his keying habits.

- "Progressive-part"[1] training. The approach to be used in the course is to divide the MPLSM operator's job into manageable parts and to teach these parts individually and how each relates to the whole job. This technique is called progressive-part training. In this technique the trainee masters subtask 1, then subtask 2, then subtask 1+2, then subtask 3, etc. The trainee practices all previously learned skills whenever a new skill is introduced.

- Forced accuracy. The trainee will be required to maintain accuracy in address keying at all times after he has learned the keying rules. Should his keying reflect inaccuracies during practice, the trainee will receive remedial drill tailored to his problem at the time. In remediation, a technique will be used of isolating and highlighting the cues to which he is not responding accurately.

- Individualization. The particular text, simulation speed, remedial sequence, or feedback a trainee sees at any given time is tailored in time to his specific skills, problems, or questions. The overall length of the training course and the length of any given lesson will be determined by individual trainee needs and capabilities. In addition to AIDS-controlled individualization, the trainee has six special control options for directing the lesson activities.

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[1] Singer, Robert N. Motor Learning and Human Performance. New York: MacMillan Publishing Company, 1975.

COURSE STRUCTURE

The course will be divided into a series of lessons and modules. A lesson represents a major grouping of job relevant enabling skills and knowledges which teach to a single terminal objective. The enabling objectives within a lesson can be grouped into meaningful, teachable units called Modules. Lessons are designated by a letter (A-Z) and modules within that lesson are designated by the Lesson designator plus a letter (A-Z). For example, Module AB is the second module in Lesson A; BA is the first module of Lesson B, and so on. The Lesson/Module structure of this training program is shown in Table 1. The module objectives are presented in Appendix A.

Training will be scheduled for 2 hours daily, 5 days per week, Monday through Friday. Total time limit to complete all lessons is 80 hours. The AIDS MPLSM training program consists of 8 lessons containing 1 to 9 modules each. A final qualification test (criteria based upon USPS policy) will be given at the end of the final module of the last lesson.

In the current iteration of the course, all trainees will take a battery of Entry Characteristics Tests (ECT's) after they learn about AIDS (Lesson A). Regardless of their scores on the tests, all trainees will be accepted in the course. The rationale for these tests and possible future applications follow below. Descriptions of the tests can be found in Appendix B.

As discussed in the Task Analysis Report[1], the tasks of the MPLSM operator have been analyzed into perceptual, decoding and motor responding components.

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[1] Hillelsohn, Michael J., Rosenblatt, Richard D., Price, Phyllis, and Seidel, Robert J. Task Analysis of Multiple Position Letter Sorting Machine (MPLSM) Operator's Job, Research Product RP-ED-76-18. Alexandria, VA: Human Resources Research Organization, September, 1976, p. 29.

Table 1–MPLSM OPERATOR'S COURSE

Lesson A: Orientation to AIDS

MODULE	
A	The numeric portion of the auxiliary keyboard
B	The function keys of the auxiliary keyboard

Entry Characteristics Tests

Lesson B: Orientation to the MPLSM Operator's Job

A	Overview of the MPLSM operator's job
AD	Alternate module of BA
B	Tour of the LSM area

Lesson C: The MPLSM Keyboard

A	Proper keying procedures
B	Three-digit keying on the lower right keyboard
C	Two-digit keying on the upper right keyboard
D	One-digit hits on the upper right keyboard plus two on the lower
E	Keying the right-hand keyboard
F	Three-digit keying on the lower left keyboard
G	Two-digit keying on the upper left keyboard
H	One-digit hits on the upper left keyboard plus two on the lower
I	Keying the left-hand keyboard
J	Keying the entire keyboard

(B–E: or; F–I: or)

Lesson D: Scheme Training

A	Overviews of scheme training
B	Keying "what you see" mail
BD	Key from five-digit numbers
C	Keying Canadian, foreign, international air and special delivery mail
D	Keying States uncoded, New York State uncoded and Nixies
E	Keying doubles, and unfaced mail
F	Keying three Syracuse SCF's
G	Keying Utica, Albany and Rochester SCF's
H	Keying Watertown, Binghamton and Elmira SCF's
I	Practical Exercise I

Lesson E: Introduction to Ledge Loading (one module)

Lesson F: Practical Exercise II

Lesson G: Introduction to Sweeper Tying (one module)

Lesson H: Practical Exercise III

Qualification Test

The selection tests have been designed to measure one or more of these abilities. As feasible, entry tests will be administered on-line. Data from these will be correlated with time as well as achievement criteria on qualification exams in order to arrive at a predictive equation for end-of-training success. These test scores will be supplemented as appropriate in the predictive equation by within-course performance indices.

A valid equation used to predict achievement or success in training would be especially useful to the USPS in its selection of applicants for the MPLSM operator's job. The earlier an applicant's probability of success or failure in a training program is identified, the more efficient (less costly, more effective) will be the USPS personnel selection and training system. Applicants with a high probability of failure can be screened out early. However, prior to extra training, care must be taken not to create screening devices that are too restrictive if the supply of applicants is scarce.

The most likely predictors of training success are samples of the tasks that trainees are required to perform. For this reason scores obtained on tests in the early part of the training program will be used on the proposed development of a predictive equation. Such job-relevant predictors may point to behaviors which can be translated into valid selection tests for future use.

Relevance and realism are the basis for selection of work sample entry tests to be used in the validation study. The criteria of speed and accuracy will correspond as closely as feasible to those criteria required in the MPLSM operator's job.

The instructional logic which the MPLSM training incorporates permits a course structure which is flexible and easily modified. The instruction may need to be altered for applications in other cities where different relationships hold between zip codes and the keys that the individual has to press. That is,

even if the prerequisite structure for one city's scheme training may not be the same as the prerequisite structure for other cities, the instructional logic will be relevant. The only lesson which will be specific to the Syracuse application is the lesson which teaches the Syracuse scheme (Lesson D). The rest of the course will be generalizable to other MPLSM operator training applications and sites. Those frames outside of Lesson D which make specific reference to the Syracuse site will be flagged in the instructional logic. Within Lesson D the instructional content will change, but the pedagogical format will be transferable.

The keying paradigms can be pedagogically described in terms of the stimulus (envelope characteristics) response (keying) relationships. The stimulus is primarily a portion of the zip code although other characteristics of the envelope and/or address are also cues for memory items. Where the stimulus is numeric and the keying response involves pressing keys representing the same numbers, the S-R relationship is called isomorphic. Where the key press responses are for numbers different from the relevant portion of the zip code, the relationship is called interfering. Finally, where the keying response is made to a non-numeric stimulus for the envelope, the relationship is called irrelevant. The first set of responses which are taught in Lesson D (scheme training) are the isomorphic relationships ("key what you see"). These responses are the easiest portion of the scheme for the trainee to learn. The second set of modules (DC, DD, DE--two-digit memory items) teach the trainee the irrelevant S-R relationships. The final modules (DF, DG, DH), before Practical Exercise I, train him on interfering S-R relationships. The latter are the most difficult to learn.

Each module provides instruction, practice, and a quiz on the training objective(s) for that module. These sections are the Telling (T), Practice (P),

and Quiz (Q) sections, respectively. Within these sections the trainee has a variety of options, as explained below. An auxiliary keyboard will be provided as part of the AIDS training system. It is included in order to eliminate possible interference with correct LSM keying procedures. If the MPLSM keyboard was to serve a dual function, a lack of isomorphic stimulus-response conditions would create, we believe, an inhibiting influence to learning the proper keying techniques. The keys of the auxiliary keyboard are illustrated in Figure 1. Trainees will use this keyboard in a variety of ways as they progress through the course. Its functions will be described below in the discussion of the options available to trainees in the AIDS program.

When the trainee enters a module, he is told the objective of that module. He then goes into the T-section automatically. From any T-section frame, the trainee can request DRILL, in which case he is skipped to the beginning of the practice section. He can also issue an instructor call (INSTR key) in which case a message will appear on the instructor console, showing the trainee's sign-on number, station, location in the course, and time when the call was issued. Besides appearing on the instructor's console, this information is also stored in the student's record.

In the T-section, if the trainee feels that he needs information already seen in the previous frame, a one-frame BACK option is available to him. When the student has obtained the required information, he can continue in the module from the point at which he initiated the option by pressing the NEXT key.

While in the practice (P) section, if the student presses the TELL key he will be taken back to the beginning of the T-section. If he activates the DRILL key while in the P-section, he will get additional practice problems similar to the one he was working on when he invoked this option. By pressing

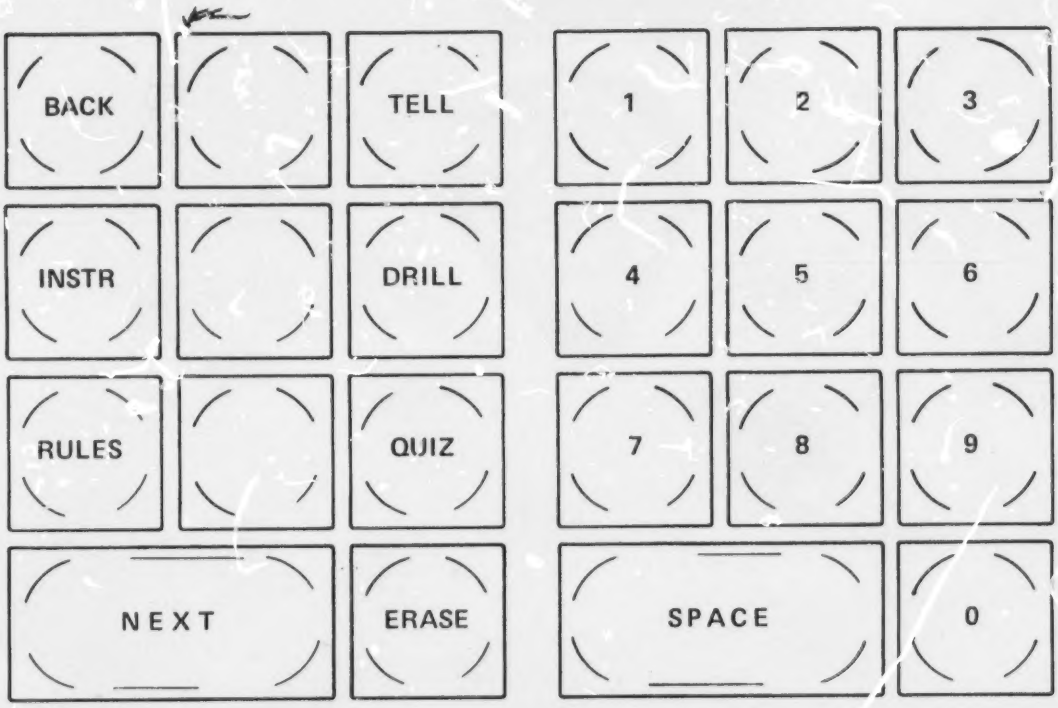

Figure 1. Auxiliary Keyboard

the QUIZ key, the trainee can be post-tested on the module objective whenever he feels he is ready. This option will remain active as long as the trainee does not fail the post-test for too many successive modules. If the trainee's course history data indicate that his error rate is too high when using the quiz option, the system will deactivate this option (and he will be informed of this) until his error rate goes down.

Learner control of instruction can be an important contributor to the success of MPLSM training in terms of potentially reduced training time and increased learner motivation, but prior research indicates that some checks and balances must be maintained via system control to correct the learner if he uses his options inefficiently. In addition, the system, because of the amount and kind of data which it has available for decision-making, may be better able to make diagnostic and prescriptive decisions for the trainee.

Based on module post-test performance, where appropriate, the system will make the decision to continue on with the next piece of instruction, or force a review of the present piece of instruction. The trainee will be allowed two tries on a particular post-test. Then the system will force an instructor call. It will be the instructor's function to guide the student through the piece of instruction and allow the trainee to take the post-test again. On-line systems decisions will be based on parameters such as the number of errors the trainee is making, the types of errors, the rate of his response, and his option use.

The length of the Telling section of a module will vary depending upon module objective. Within the Telling section, the trainee will be required to make responses indicating that he does understand the operation at hand. Appropriate confirming or remedial feedback will be given for each trainee response in this section.

After the Telling section, the trainee enters the Practice section. While he is practicing the keying responses related to skills treated in the module, the system keeps track of his errors and tailors the practice items to his individual needs. The extent to which the practice cues simulate MPLSM operation and letter mail facsimiles depends on the nature of the skills being learned in that module. In all scheme training modules, the zip code will be shown on the screen in the context of a facsimile letter/card and in all the variations of typefont, letter size, handwriting, etc., that will be seen on the job. If at any point in a module within Lesson D a trainee requires information on coding procedures for the scheme he is learning, he can request that information by pressing the RULES key. On initiating this option, the trainee's screen will clear and the coding scheme and keying rules for that scheme will come on the screen.

In the Quiz section of the module, the trainee demonstrates proficiency in the objectives of the module. The modules in Lessons C, D, F and H will not have distinct Q-sections. During these lessons the trainee is keying and his performance will be monitored continuously. When the trainee's performance reaches criterion, he will be branched to the next module (lesson).

COURSE ORGANIZATION

The organization between lessons in the course as designed is linear. Within lessons, remedial branching has been provided for. There are two primary bases for the present linear course structure. First, the prerequisite relationships between course objectives and, second, when no prerequisite (enabling) relationship exists, to provide for maximum transfer of abilities from one lesson (module) to the next. For example, since data estimates from the address sampling indicate that "keying as he sees" (Module DB) constitutes a major component of the keying response of the job incumbent, and Module DB carries forward the isomorphic stimulus-response training obtained in MODULE CI, this portion of the scheme should be learned first. The present course flow is designed so that the skills mastered in each module facilitate the acquisition of skills in the following module.

The matrices below show the prerequisite relationships between the objectives of lessons and then between modules within lessons. Prerequisite relationships were determined based upon the enabling skills and knowledges data in the Task Analysis report. The matrices are constructed as follows. Whenever the entry on the row is a prerequisite for the entry on the column, a one is entered in the cell which represents their point of intersection. For example, the lesson matrix is interpreted as follows: (See Figure 2 for Lesson Matrix.)

Lesson A is a prerequisite for Lesson B

Lesson B is a prerequisite for Lessons C, E and G

Lesson C is a prerequisite for Lesson D

Lesson D is a prerequisite for Lesson F

Lesson F is a prerequisite for Lesson H.

For the first iteration of the MPLSM console operator's course, the lessons will be presented linearly. Modifications to this presentation sequence will be based upon formative evaluation data.

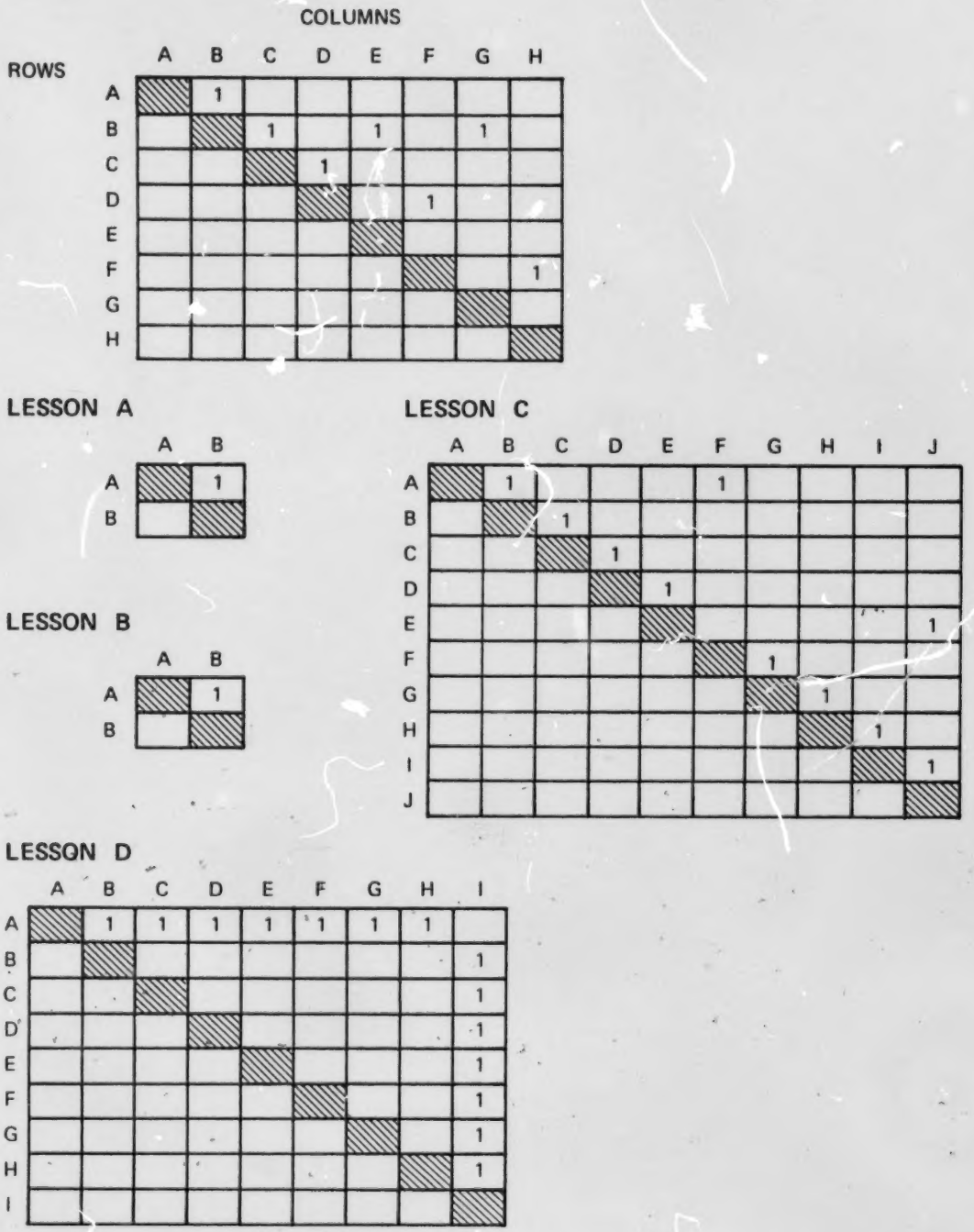

Figure 2. **Lesson Matrix**

REMEDIATION STRATEGIES

The overall remediation strategy is to provide individualized assistance to the trainee whenever it is required. The particular methodology will vary depending upon:

(a) The needs of the trainee at that point in time;

(b) the characteristics of the subject matter at that point in time;

(c) the design of the module wherein the remediation is required.

The methodologies to be employed will include:

(a) Feedback after the trainee enters an answer to a question;

(b) Specific remediation modules which present the information to be learned in an alternate form and/or teaches an enabling knowledge or skill before the trainee returns to the original module;

(c) special drill and practice exercises on aspects of keying which the trainee consistently miskeys;

(d) forced review of portions of earlier T-sections which provide detailed instruction specific to the errors being made;

(e) adjusting the sortation densities of mail characteristics while the trainee is in a P-section, to provide more practice on particular characteristics which are being responded to erroneously.

STUDENT FEEDBACK MODES

One of the most important aspects of computer-assisted instruction is the ability of a well designed program to provide immediate feedback to the learner regarding his performance. This feedback serves to confirm correct responses, thereby reinforcing appropriate responses, and remediate incorrect responses in such a manner as to give the trainee enough information to respond correctly on subsequent items.

Several types of feedback will be employed in the MPLSM operator training. During T-sections, where trainees are answering specific questions, feedback will immediately follow the input of the trainee's answer. The trainee will be informed whether his answer is correct or incorrect. In the incorrect instance the correct answer will be provided as part of the immediate feedback, or after another attempt at the question if the trainee is allowed two attempts.

During the P-sections, two types of feedbacks are used. One is the timing light on the MPLSM keyboard. When the keying cycle is over and the trainee has not keyed the entire code, the light will blink, informing the trainee that he is keying too slowly. When he is keying in a rhythm which is synchronous with the presentation of stimuli, the light will not blink. This serves as confirming feedback regarding the trainee's keying rhythm.

The other type of P-section feedback to the trainee is a response summary page which shows the trainee the number of items in the last practice group, how many were keyed accurately and the specific key codes which were entered incorrectly accompanied by the correct response. The trainee will continue with additional practice (in the P-section) on more groups of facsimiles, with the frequency of occurrence of a particular cue based on the errors made in the previous group. After each group, the trainee will receive performance-related

feedback. In this manner, the trainee can monitor his own progress within a module. (System monitoring of the trainee performance is, of course, an on-going process whenever a student is on-line). The assessment of achievement of the module criterion will only take place after the facsimile mail has returned to normal frequencies for that module.

When the trainee reaches criterion for a module, he will also see a performance summary frame. Thus, even when the trainee passes a test, he will be informed of the errors made during the test-taking. This feedback page will contain:

(a) The total number of key-codes (items) responded to correctly, and % correct;

(b) the total number of key-codes (items) responded to incorrectly;

(c) the correct response for erroneous items;

(d) the keying tasks--the rate at which the stimuli were presented.

REFRESHER TRAINING

To ensure that operators maintain a proficiency level of 98% accuracy on the job, MPLSM supervisors are required periodically to monitor operator performance during the work tour. If performance consistently falls significantly below the 98% criterion or if performance indicates a consistent pattern of keying errors, operators are referred for refresher training. When an individual signs onto AIDS for refresher training, the system logic will branch him to Practical Exercise II. AIDS can also accommodate those instances when the supervisor has determined the operator's retraining requirements. When an operator is registered onto the system, whichever module he requires is prescribed and will be presented before the trainee goes into Practical Exercise II and the instructional sequence described below.

The instructional model employed in Practical Exercise II monitors the trainee's keying accuracy on a continuous basis. If the continuous sampling reveals a consistent error in the keying responses, the frequency of occurrence of the stimulus for that response will increase. If this is sufficient to increase the trainee's performance, the frequency of the specific stimuli will return to normal until he keys at criterion. If this is not sufficient to enhance the trainee's performance, he will be branched to the module in the training program, which teaches the skill he requires. That module will teach a particular portion of the scheme and/or emphasize practice of a particular keying combination. When the trainee has reached criterion for that training module he will return to the Practical Exercise II and again have his performance monitored. When the criterion of 98% accuracy at a presentation rate of 60 lmp is achieved for 30 minutes, the operator can return to the floor.

THE ROLES OF THE INSTRUCTOR

The instructor has two primary roles in AIDS. He is both a manager of the training environment, and an information resource for the trainee. As a manager, his duties include:

- monitoring system status
- insuring an adequate supply of off-line materials
- registering new trainees onto the system
- start-up and shut-down of the computer system
- fix minor problems with the system (e.g., replace boards, change author language software, etc.)
- recognize major problems which require expert assistance
- monitor student progress and attendance
- submitting off-line administrative programs to the AIDS.

As an information resource his responsibilities include:

- providing assistance to trainees who request help via the INSTR function key
- guiding trainee through the third attempt at quizzes
- conducting the tour in module BB
- administering and scoring a portion of the CA quiz
- monitoring student performance and giving instructionalized assistance to trainees if they appear to require it.

Appendix A

OBJECTIVES

LESSON / MODULE

A *Orientation to the AIDS training system.*

In this lesson the trainee will become familiar with the AIDS training system.

A At the end of this module the trainee will be able to answer questions presented on the video screen by using the numeric keys on the auxiliary keyboard correctly.

B At the end of this module the trainee will be able to use the function keys on the auxiliary keyboard to control his path through a simulated course, call the instructor, and modify his answers to questions.

Entry Tests--At this point the trainee takes a battery of on-line tests.

B *Orientation to the MPLSM operator's job.*

This lesson consists of an audio-visual presentation, which presents an overview of the MPLSM operator's job, an on-line quiz and remedial sequences and a tour of the LSM facility on the floor at the Syracuse P. O.

A At the end of this module the trainee will be given lists of text elements on the video screen and he will be able to:

- Order the procedures for the beginning of a tour to include--picking up badge, punch badge at operation, get assignment, clock off if not assigned to MPLSM, and check with foreman for reassignment. (Task statements 1.1 - 1.3.1.1)
- Select critical elements of keyer's job to include--accurately input key codes to sort mail into proper bins, getting relevant information from mail piece so that proper code is keyed, and knowing the scheme being worked. (Task statements 2.5 - 2.6)

LESSON MODULE

- Select critical elements of ledge-loader's duties to include--keeping consoles' feeder belts full, checking the mail before it gets to the machine, placing mail on the feeder belt so the keyer sees the side with the address. (Task statements 5.4 & 5.6)

- Select critical elements of sweeper-tyer's duties to include--not letting bins get too full, verifying mail, and dispatching mail. (Task statements 8.4 - 8.7)

- Order the steps involved in the flow of a letter from the pie cart through dispatch to include--ledge-loader getting tray of mail from the pie cart, dumping the tray onto the ledge, placing mail onto the feeder belt, console operator keys in proper key code based on the zip code of the letter, letter falls into bin on sweep side, sweeper-tyer removes handful of mail from the bin, verifys handful to make sure letter belongs in the bin, mail is "tied-out," bundle of mail is placed on/in dispatch conveyance.

- Select the relevant statements describing the advantages of using the LSM over manual-case sortation to include--processing more mail and getting mail to its destination quicker.

AD This module is an alternate version of module BA. It will present remedial sequences, on-line, specific to the BA quiz items which the trainee answered incorrectly. The quiz for this module is the BA quiz.

B This module consists of a tour of the actual LSM area. The trainee will fill out a checklist of things seen on the work floor (using paper and pencil off-line) to include--the LSM console in operation, a pie cart, a ledge-loader emptying a tray onto a ledge, a ledge-loader filling a feeder belt, a console operator keying at least ten letters in a row, the timing light on the console, the bins on the back of the machine, a sweeper-tyer removing letters from the bin, tied-out bundles of mail in a utility cart, and the supervisor's station.

C *Learning the keyboard.*

In this lesson the trainee will see an audio-visual presentation instructing him on proper keying procedures and then master a series

LESSON	MODULE	
		of nine modules which teach the keyboard. The trainee will see the series of modules which trains him on that part of the keyboard where the trainee's preferred hand is used first. At the end of the lesson the trainee will be keying at the rate of 50 per minute. The stimuli for this lesson are two- and three-digit numbers and the trainee will be taught to start keying only when the number starts to move away. The immediate cue for responding will be the movement of the number.
	A	This module consists of an audiovisual presentation on proper keying procedures with a two-part quiz. An on-line portion and an instructor administered portion both of which test the trainee's ability to:

On-line portion

- Order the steps required in preparation for keying to include--adjusting the chair, adjusting the viewing light, checking for an imprinter, starting to key at the third ring of the warning bell, turning the console on and pressing the vacuum button (Task statements under 2.1) from a list of statements on the video screen.

From a picture on the audiovisual device of the LSM console with nine parts of the console labeled, the trainee will:

- Identify the location of the imprinter.
- Identify the location of the power light.
- Identify the location of the power button.
- Identify the location of the vacuum button.
- Identify the location of the viewing light adjustment.
- Identify the location of the inserter tube.
- Identify the location of the vacuum pick-off arm.

Instructor Administered (criteria per M-54)

- Adjust his/her chair to proper height.
- Sit in front of the simulated console in the proper posture.
- Position fingers correctly over the MPLSM keys.

	B	This is the first module where the trainee will use the MPLSM keyboard as the primary interface with AIDS system. The goal of this module is to teach the lower right-hand keyboard (0-4).
		The format for this module is as follows. In the T-section the stimuli will be single numbers (0-4) and the trainee will respond with hits on the lower keyboard. This portion of the keyboard training will be self-paced, as will three-digit responses during the T-section. During this part of the training,

LESSON	MODULE	
		a picture of the keyboard, with the keys labeled, will be available via the RULES key for display on the video screen. When the trainee goes into the P-section, single-digit stimuli are presented at the rate of 30 per minute. After a warm-up period of six minutes, performance is sampled and if it is less than 80% correct in a 3-minute block (more than 18 wrong), the presentation speed will be dropped to 25 numbers per minute. When the trainee has 30 consecutive correct responses the system will start presenting three-digit stimuli at a rate of 30 per minute. The presentation rate will be raised to 40 per minute when the trainee achieves 90% correct at 30 per minute for three minutes.
		At the end of this module the trainee will be able to key three digit hits on the lower right keyboard (0-4) at a rate of 40 per minute with 95% accuracy for six minutes.
		The rest of the modules in this lesson will follow the same format as this one.
	C	At the end of the module, the trainee will be able to key two-digit hits on the upper right keyboard (0'-4') at a rate of 40 per minute with 95% accuracy for six minutes.
	D	At the end of this module the trainee will be able to key a three digit hit consisting of one upper and two lower on the right keyboard (0'-4' and 0-4) at the rate of 40 per minute with 95% accuracy for six minutes.
	E	At the end of this module the trainee will be able to key an equal mix of two upper, three lower, and one upper, two lower hits on the right keyboard at the rate of 40 per minute with 95% accuracy for six minutes.
	F	At the end of this module the trainee will be able to key three digit hits on the lower left keyboard (5-9) at a rate of 40 per minute with 95% accuracy for six minutes.
	G	At the end of the module the trainee will be able to key two digit hits on the upper left keyboard (5'-9') at a rate of 40 per minute with 95% accuracy for six minutes.
	H	At the end of this module the trainee will be able to key a three digit hit consisting of one upper and two lower on the left keyboard (5'-9' and 5-9) at a rate of 40 per minute with 95% accuracy for six minutes.

LESSON	MODULE	
	I	At the end of this module the trainee will be able to key an equal mix of two upper, three lower, and one upper, two lower hits on the left keyboard at a rate of 40 per minute with 95% accuracy for six minutes.
	J	In this module the trainee will be required to respond to stimuli with both hands. This involves fourteen (14) new responses (RLR, LRL, RRL, LLR, RLL, LRR, R'LR, L'RL, R'RL, L'LR, R'LL, L'RR, R'L', L'R') which the trainee can practice in a self-paced mode in the T-section. Remedial loops specific to each response will be available if the trainee is diagnosed to have problems with a particular response sequence(s) during practice. At the end of this module the trainee will be able to key an equal mix of two upper, three lower and one upper-two lower, requiring the use of both hands, at a rate of 50 per minute with 95% accuracy for six minutes.
D		*Scheme Training*
		This lesson teaches the behaviors, and enabling skills and knowledges required for tasks 2.4 (Examine letter when it stops) thru 2.6 (Key in the selected code . . .). This lesson employs the "progressive part" training discussed earlier. Scheme elements are repeated throughout the practice sections of modules successive to the module in which that particular element was taught. Therefore, modules beyond module DB will have double criteria. The first is for the scheme element(s) being taught in that module and the second is for the combination of elements taught up to that point. The stimuli used in this lesson are computer-generated facsimile mail.
	A	This is an overview module wherein the remainder of the lesson will be explained to the trainee. The trainee is shown the scheme and told that the RULES key provides access to the scheme if the trainee requires it during practice. There is no quiz for this module.
	B	This first "scheme module" will teach the trainee to respond to "key what you see" ZIP codes. The remainder of the modules in this lesson will follow the format of this module (DB). The T-section will allow the trainee to respond to facsimile mail at his own pace. The trainee will be told what to attend to on the mail to elicit the correct response. The relevant cue (in this case the ZIP code) will appear at different locations on the envelope and address lines to give the trainee practice at scanning the envelope to find the appropriate cue. Type fonts will be varied and mixed with handwritten addresses. The trainee will enter the P-section at a rate of 50 lpm.

LESSON	MODULE	
		He will be allowed a six minute warm-up period and then a three minute performance sample will be taken. If the performance is less than 80% correct (more than 30 out of 150 wrong) the presentation rate will be reduced by 5 lpm. If performance is between 80 and 89% accurate the 50 lpm rate will be maintained until the trainee's performance is greater than or equal to 90% accuracy over three minutes. At that point the rate is raised to 60 lpm and the same performance sampling algorithm (figure DB1) is applied. At the end of this module the trainee will be able to key three digit hits, in response to "key what you see" ZIP codes which appear on facsimile mail, at a rate of 60 lpm with an accuracy of 90% for six minutes.
	BD	This is a remedial module for module DB. If the trainee cannot key at 40 lpm with 80% accuracy for three minutes in DB he will be routed to this module. In this module the stimuli will be five digit numbers and the trainee will be required to key the first three digits. At the end of this module the trainee will be able to make three digit hits to five digit stimuli at a rate of 50 per minute with 95% accuracy for 6 minutes. When the trainee achieves this objective he is returned to module DB.
	C	At the end of this module the trainee will be able to • Key Canadian, foreign, international air mail, and special delivery mail at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of foreign, air mail and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.
	D	At the end of this module the trainee will be able to • Key states uncoded, New York State uncoded, and nixie mail at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of states uncoded, New York State uncoded, nixie, foreign, air mail, special delivery and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.
	E	At the end of this module the trainee will be able to • Key doubles and unfaced mail at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of doubles, unfaced, states uncoded, New York State uncoded, nixies, foreign, air mail, special delivery and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.

LESSON	MODULE	
	F	At the end of this module the trainee will be able to • Key three Syracuse SCF's at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of three Syracuse SCF's, nixies, doubles, unfaced, states uncoded, New York state uncoded, foreign, air mail, special delivery and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.
	G	At the end of this module the trainee will be able to • Key Utica, Albany, and Rochester SCF's at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of Utica, Albany and three Syracuse SCF's, nixies doubles, unfaced, states uncoded, New York State uncoded, foreign, air mail, special delivery and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.
	H	At the end of this module the trainee will be able to • Key Watertown, Binghamton and Elmira SCF's at a rate of 60 lpm with 90% accuracy for six minutes. • Key a mixture of Watertown, Binghamton, Elmira, Utica, Albany, Rochester and three Syracuse SCF's, nixies doubles, unfaced, states uncoded, New York State uncoded, foreign, air mail, special delivery and "key what you see" mail at a rate of 60 lpm with 90% accuracy for six minutes.
	I	Practical Exercise I This module is the first of three practical exercises which the trainee will take. In the practical exercises the sortation densities of the facsimile mail are representative of the densities on the MPLSM in Syracuse. During the practical exercises the densities may be varied for remedial purposes but the criteria must be achieved on the realistic density. At the end of this module the trainee will be able to key representative facsimile mail at a rate of 60 lpm with 98% accuracy for fifteen minutes.
E		*Introduction to Ledge Loading* This lesson consists of an audio-visual scenario entitled "Ledge loading for the MPLSM" and an on-line quiz with remedial materials

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following the quiz (if required). The on-line quiz consists of a series of text elements presented on the video screen.

A At the end of this module the trainee will be able to

- Identify the characteristics of non-machinable mail to include--undersize, oversize, too heavy, flimsies, open flaps and dog-eared.
- Identify the proper way to empty a tray of mail to include--overturning tray and emptying mail onto ledge so that stamps are facing away from the keyboard and down (Task statement 5.5.2)
- Identify reasons for bouncing mail to include--elimination of doubles, moving addresses into window of window envelopes and finding oversize envelopes. (Task statement 5.6.2)
- Identify tasks to be performed by ledge-loader to include--supplying consoles with mail, culling non-machinable mail and "running" mail, removing mail from 0 and 400 bins, insuring that mail continues to move on console by adjusting photocell and removing nonmachinable mail from the feeder belt.
- Identify definition of "running" mail.
- Identify action to be taken with a tray of running mail.
- Identify the correct angle for a letter on the feeder belt.
- Identify the correct orientation of a letter on the feeder belt.
- Select the steps in relieving a console operator to include all 2.2 Task statements except 2.2.2.1 (put on earphones).
- Identify a pie cart from a picture presented on the audio-visual device.
- Identify the photocell on the console from a picture presented on the audio-visual device.
- Identify the feeder belt on the console from a picture presented on the audio-visual device.
- Identify the ledge on the console.

F *Practical Exercise II*

The criterion for this practical exercise is keying at 60 lpm with 98% accuracy for 30 minutes. With this criterion exception, the description of module DI applies to this exercise as well.

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G *Introduction to Sweeper Tying*

This lesson consists of an audio-visual presentation entitled "Sweeper Tying on the MPLSM," an on-line quiz, and on-line remediation for the quiz. For those objectives listed below which use the verbs "identify," "order," or "select," the trainee will be responding to text elements on the video screen.

A At the end of this module the trainee will be able to

- Identify the Sweeper Tyer's duties to include--removing mail from bins, verifying, tying out the mail, traying or loose packing the mail, fixing dropper jams, and taking care of cart top problems.
- Select the statement(s) which best describes the importance of verifying.
- Identify the part of the address examined during verifying (lines with zip code).
- Identify the correct way to hold the mail while verifying (left hand over return address area, right hand on bottom).
- Identify the criteria for removing mail from a bin (greater than 1/4 full).
- Identify the location of full bin light from a picture on the audio-visual device.
- Identify location of photocell in a bin from a picture on the audio-visual device.
- Identify location of dropper from a picture on the audio-visual device.
- Identify location of emergency stop from a picture on the audio-visual device.
- Identify location of dropper switch from a picture on the audio-visual device.
- Identify location of dropper jam light from a picture on the audio-visual device.
- Order the steps for clearing a dropper jam to include--hear dropper jam signal, turn off the toggle switch, open inserter dropper access door, call mechanic if letter is below the red-band, remove the letter or move the dropper back and forth or move dropper belt, turn toggle switch to on position, close doors (Task statements 9.1.1 - 9.1.8)

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- Order steps for taking care of cart-top problem to include--see that light over end module is on, open door at the end panel, remove letter, push reset button, close panel (Task statements 9.6 - 9.6.5)
- Identify steps for scheme change activities to include--sweep non-compatible bins or place insert in non-compatible bins.
- Identify the three labels on a bin by location from a picture on the audio-visual device.
- Match the color of the bin label to the type of label.
- Order the steps from removing mail from a bin to dispatching, to include--remove a handful of mail, edge the mail, check bin label, verify mail, tie out the mail or tray it. (Task statements under 8.4, and 8.5 and 8.6).
- Identify proper facing of mail in trays.
- Identify "E" and "S" scans as most effective way to scan module.
- State that seven full bins will make the whole machine shut down.

H *Practical Exercise III*

This lesson is the same as Practical Exercise II and gives the trainee final preparation for the qualification test.

Appendix B

ENTRY CHARACTERISTICS TESTS FOR MPLSM OPERATORS

1. Single-Character Visual Discrimination Test

Basis for Test: One of the most elementary visual discrimination abilities used by the MPLSM operator requires distinguishing zip code numbers from alphabetic characters. This test is designed to measure the operator's initial capacity for such discriminations by presenting on the simulator screen letters or numbers in typefont at a size to appear subsequently on envelopes. The Motor component is minimized by using one keyboard response using the long zero or five key from the LSM keyboard.

Measures: Accuracy and Reaction Time (RT). RT is defined from presentation to key depression.

Stimuli: Series of randomly chosen letters or single-digit numbers.

Key Used: The Zero or Five key, contingent on right- or left-handedness, respectively.

Response: Key press with index finger of preferred hand to number stimuli only.

Procedures: Twenty practice trials will be given at a rate of one per second. Ten trials for latency measurement at same rate; ten trials at two per second for accuracy measurement.

2. Single-Digit Discrimination Reaction Time Test

Basis for Test: A portion of the LSM operator's tasks require associational capabilities for both Encoding and Decoding. The operator must be able to perceive the differences among the various zip code digits and to connect these discriminations to overt motor responses (key presses). This test is designed to reveal the trainee's base level of "stimulus differentiation." The trainee is required to respond solely to one digit, the zero, by pressing the Zero key as soon as he sees the number Zero (0) appear on the screen of the MPLSM training simulator. The test is further simplified by permitting the trainee to respond with his preferred hand.

Measures: Accuracy and Reaction Time (RT). RT is defined from presentation to key depression.

Stimuli: Series of randomly chosen single-digit numbers.

Key Used: The Zero key.

Response: Key press with index finger of preferred hand.

Procedures: Twenty practice trials will be given at a rate of one per second. Ten trials for latency measurement at same rate; ten trials at two per second for accuracy measurement.

3. Double-Digit Visual-Motor Test

Basis for Test: Responding with two hits on the keyboard represents a step closer to a work sample of the MPLSM keying tasks. This test adds a greater degree of relevant Motor responding to a more complex visual discrimination requirement. The abilities are tested at an elemental level by permitting the trainee to respond with whatever fingers he prefers to use from either hand.

Measures: Accuracy. Time measures will include Reaction Time (RT) and Movement Time (MT). RT is defined from presentation to key depression; MT is the interval from the first key press to the end of the last.

Stimuli: Series of randomly chosen pairs of digits (0-9).

Keys Used: Appropriate numbered keys of lowerkeyboard. Keys will be labeled.

Response: Key presses with preferred fingers from either hand.

Procedures: Twenty practice trials at the rate of one per 3 seconds. Ten critical trials for latency at one per 2 seconds; ten trials for accuracy at one every one second.

4. Three-Digit Visual-Motor Test

Basis for Test: This test represents a close approximation to a major psychomotor work sample, "key as you see" with a three-hit response. At the same time, it is designed to be an elementary measure of eye-hand coordination capacity and visual discrimination. Choice of responding fingers on hands is left to the trainee in order to minimize motor skill requirement.

Measures: Accuracy and Reation Time (RT), plus MT. RT is defined from presentation to key depression; MT is the interval from the first key press to the end of the last.

Stimuli: Series of randomly chosen triples of digits (0-9).

Keys Used: Appropriate numbered keys of lower keyboard. Keys will be labeled.

Response: Three-digit key presses with preferred fingers from either hand.

Procedures: Twenty practice trials at the rate of one every 4 seconds. Ten critical trials for latency at one every 3 seconds; ten trials for accuracy at one every 2 seconds.

5. *Finger Dexterity Test*

Basis for Test: This test is designed to measure the motor component of the keying task, independent of the perceptual component. In this test the trainee is to press the labeled keys in sequence (0-9) as many times as possible within the time allowed. Some individuals may have difficulty in learning the MPLSM operator's keying task because of an inability to perform the appropriate finger movements rapidly enough. It is the purpose of this test to measure the keyboard finger dexterity capabilities of the trainee population.

Measures: The number of correctly sequenced keyboard presses within the time allowed.

Stimuli: Instructions to begin keying at a given signal.

Keys Used: Numbered keys of the lower keyboard (keys will be labeled).

Response: Pressing the keys 0-4 and 5-9, in sequence, with preferred fingers from either hand; and repeating the sequence as often as possible in the time allowed.

Procedures: The trainees will be required to press all the keys in sequence as rapidly as possible. There will be a one-minute practice period followed by a one-minute test period in which a count will be made of correctly sequenced key presses.

6. *Address Verification Test*

Basis for Test: One of the visual discrimination abilities required of MPLSM operators is the rapid identification and verification of addresses. The test involves the comparison of addresses. For each test item there are two addresses. The trainee must compare both the first and second lines of the two addresses and decide among four possible alternatives. These alternatives are:

BOTH SAME - the first and second lines of both addresses are the same.

SAME/DIFFERENT - the first lines of the two addresses are the same while the second lines are different.

DIFFERENT/SAME - the first lines of the two addresses are different while the second lines are the same.

BOTH DIFFERENT - the first and second lines of both addresses are different.

Measures: The total number of items the trainee answers correctly within the time allowed.

Stimuli: A pair of two-line addresses will be presented side by side on the AIDS screen until the trainee presses the appropriate response key on the auxiliary keyboard. A total of 100 items will be presented.

Keys Used: The keys numbered 1, 2, 3 and 4 on the auxiliary keyboard.

Response: The key selected will be based on the trainee's decision regarding which alternative is correct for a given test item stimulus.

Procedures: Following presentation of instructions, the trainee will receive 4 sample test items. The 100 item test will then be presented at a rate determined by the trainee. Twenty minutes will be allowed for this test.

7. Numeric Recognition Test

Basis for Test: Short-term recognition memory of numeric stimuli is an important ability of MPLSM operators. This test consists of three-digit numbers which the trainee looks at and must remember having seen. If he has seen the number before, he presses the [2] key on the auxiliary keyboard; if he has not seen the number, he presses the [1] key. Each three-digit number appears twice in the list. The first time it appears the corresponding answer will be "1". The second time it should receive a "2" response. Between the first and second appearances of a number, there is a lag or a series of other intervening numbers separating the two. There are 10 degrees of lag ranging from 0 up to 40. The longer the lag effect the more difficult the item becomes.

Measures: Two types of measures will be taken. First, the total number of correct responses within the time allowed. Second, the number of correct responses for each degree of lag will be accumulated.

Stimuli: Three-digit numbers will be presented on the screen, one at a time, until the trainee presses the appropriate response key on the auxiliary keyboard. The next number on the list will then be presented.

Keys Used: The keys numbered 1 and 2 on the auxiliary keyboard.

Response: The key selected will be based on the trainee's decision regarding whether a stimulus has been presented before (2) or not (1).

Procedures: The trainee will receive 6 sample test items. The 400-item test will then be presented at a rate determined by the trainee. Twenty minutes will be allowed for this test.

8. Visual Scanning Test

Basis for Test: Prior to keying, the MPLSM operator makes use of his/her visual scanning ability when a letter is presented. In this test the trainee will be shown various arrays of digits, presented one at a time, and requested to read a target digit from the array. The target digits used are 1 through 6. The array digits used are 0, 7, 8 and 9. Each target digit appears once whereas each array digit appears 24 times. This combination of target and array digits comprises a 5-digit square matrix--the target digit appearing at differing positions within each square. The trainee is required to make saccadic eye movements in vertical, horizontal, and oblique directions. He indicates his response by depressing one of 6 labeled keys on the auxiliary keyboard.

Measures: Reaction times (RT) will be measured. RT is defined from the onset of stimulus presentation to onset of correct key press. Final score will be the mean reaction time taken in responding to all of the arrays.

Stimuli: One hundred and twenty differently combined 5-digit square matrices of array and target digits will be presented one at a time.

Keys Used: The keys numbered 1, 2, 3, 4, 5 and 6 on the auxiliary keyboard.

Response: The trainee will be required to press the key which corresponds to the target digit in each matrix, as rapidly as possible.

Procedures: Each matrix will be visible for 1.5 seconds during the Practice phase. In each test trial, the stimulus will be visible for one second, followed by an inter-trial-interval of .5 second. Total test time for the 120 items will be 3 minutes.

9. Three-Digit Memory-Motor Test

Basis for Test: A critical component of the keying tasks for the MPLSM operator is to make a response to a moving stimulus. This test is designed to measure a "key as you see" motor response to a three-digit stimulus after it starts to move off the screen to the left. It draws on short-term memory and responding to moving stimuli. A shaded rectangle to the left of the three-digit number provides a leading edge cue for the trainee. This work sample test is a close, elemental approximation to the basic Perceptual-Decoding-Motor sequence of the keying task.

Measures: Accuracy and RT plus MT. RT is defined from presentation to key depression; MT is the interval from the first key press to the end of the last.

Stimuli: Series of randomly chosen triples of digits (0-9).

Keys Used: Appropriate numbered keys of lower keyboard. Keys will be labeled.

Response: Three-digit key presses with preferred fingers from either hand.

Procedures: Twenty practice trials at the rate of one every 4 seconds. Ten critical trials for latency at one every 3 seconds; ten trials for accuracy at one every 2 seconds. The stimulus will remain stationary for one second. The trainee will then have 3 seconds to respond in the Practice stage; 2 seconds to respond in the trials for latency and accuracy.